MISSOURI DEPARTMENT OF NATURAL RESOURCES

CLEANUP LEVELS FOR MISSOURI (CALM) Task Force

Comments and Responses

Division of Air and Land Protection
Hazardous Waste Program

Revised September, 1998

Comments of the CALM Task Force on the February 23, 1998 CALM Final Draft with Responses from the Missouri Department of Natural Resources Voluntary Cleanup Section and the Missouri Department of Health

September 8, 1998
Final

THE CALM GUIDANCE DOCUMENT SHOULD NOT BE IMPLEMENTED AS A REGULATION

The Advisory Group believes strongly that the CALM guidance document should not be promulgated as a regulation nor implemented as if it had the force of a regulation. As guidance, the CALM document provides the regulated community and the public with a glimpse of the Department=s thinking on issues associated with the voluntary cleanup of contaminated properties in Missouri. As such, the document will provide members of the regulated community and the public with a good general expectation as to how the Department will administer the Voluntary Cleanup Program (VCP) and allow those parties to plan accordingly. As guidance, however, neither the Department nor any individual applicant in the VCP would be rigidly bound by CALM. The Advisory Group believes such flexibility is critical to the success of the VCP.

The Advisory Group very much appreciates the opportunity afforded by the Department to assist in the recasting of the CALM guidance document. However, the Advisory Group also recognizes that this process is not a substitute for rulemaking requirements; which would include oversight by the Hazardous Waste Commission; analysis of the fiscal impact of CALM; and a formal public notice and comment period.

DNR: The department agrees, and has no intention of proposing the CALM process as a regulation.

THE CALM PROCESS IN GENERAL

In any voluntary remediation program, the need for predictability is of primary importance. Parties must be able to accurately assess the time and expense involved in performing a cleanup and obtaining a Ano further action letter" under the CALM guidance document. If either the expense or time involved is prohibitive, CALM will fail to promote site cleanups, facilitate property transfers, and place contaminated properties back into productive use.

SITE ASSESSMENT/CHARACTERIZATION

Section 3.1, on page 4 reads, Athe department intends to draft a separate site assessment/characterization document in the near future which will provide more detail on the department=s expectation for adequate SAC."

Suggestion: The Advisory Group agrees with the Department that a more detailed SAC guidance is needed and suggests that the Department utilize the CALM Task Force to develop such a document.

DNR: The department appreciates the offer for assistance in the drafting of the

SAC guidance, and will consider using a similar process in its development as was used to develop CALM.

Section 3.1, on page 6 reads, Asites which pose an immediate threat to human health, safety, or the environment are not eligible for remediation under the Voluntary Cleanup Program."

Suggestion: Table 1 on page 7 lists non-aqueous phase liquids (NAPL) in Asignificant quantities" in groundwater as an example of a site condition posing an immediate threat. The logical extension is that sites with NAPL in groundwater are not eligible for the VCP. The Advisory Group believes this may be an unreasonable restriction — depending upon the meaning of Asignificant quantities."

Sites, including FMGP sites, can have NAPL present in large amounts without any immediate threat to human health or the environment because of its immobility in the subsurface (e.g. a pool of DNAPL in a deep stratigraphic trap beneath a site). Conceivably, such sites could be excluded from the VCP based upon the language in Table 1. The Advisory Group doe not believe this is the intent of the CALM guidance document and suggests including language in the CALM guidance document clarifying the Department=s intent. Possible alternate language would be Anon-aqueous phase liquids (NAPL) in groundwater in significant quantities and with mobility sufficient to pose an immediate threat to human or ecological receptors (e.g., seepage into surface waters, buildings or supply wells)."

DNR: The department agrees. It is possible for a substantial volume of NAPL to be present at a site without posing an immediate threat. In fact several current VCP sites meet this description. The CALM document has been revised accordingly.

TIER 1 ANALYSIS

Section 3.3, on page 9 reads, AAdditivity of risk resulting from exposure to multiple contaminants at a given site should be considered in a Tier 1 evaluation for sites at which multiple contaminants have been identified."

Suggestion: If multiple contaminants are present at a given site, additivity of risk is only valid and appropriate for those constituents that affect the same target organ system. Consequently, there may be sites that have multiple contaminants, but each contaminant may affect a different target organ system. The Advisory Group suggests that the Department remove the requirement that multiple contaminants be considered in a Tier 1 evaluation. The Tier 1 methodology is already sufficiently conservative to account for any additivity of risk.

It would be more appropriate to consider additivity of risk in Tier 2 and Tier 3 site-specific evaluations when multiple constituents that could

affect the same target organ system are present. There are several different methods available for determining additivity of risk. If additivity of risk is to be considered, a method acceptable to the Department should be provided in the CALM guidance document.

DOH: The Tier 1 values, themselves, do not consider additivity of risks from multiple chemicals. Section 3.3 advises decision-makers to consider the additivity of risks from chemicals that affect the same organ or system; however, we agree that additivity of risks should be presented in any assessments in Tiers 2 and 3. For more about additivity, see the comment and response on page 13.

Section 3.3, on page 10 reads, AIf the user determines or suspects that site conditions are **grossly misrepresented** by the assumptions and methodology described in Appendix A .... a Tier 2 or Tier 3 evaluation may be justified."

Suggestion: The Advisory Group suggests revising this sentence by removing the phrase Agrossly misrepresented by" and replacing it with Anot consistent with." The phrase Agrossly misrepresented by" is too strong and is inconsistent with other sentences in the CALM guidance document discussing movement to Tier 2. In addition, use of such language could be construed as establishing a threshold test for movement to Tier 2 which would serve as a strong disincentive to participate in the VCP.

DNR: The term Agrossly misrepresents" has been replaced with Anot consistent with" throughout the document.

Section 3.4, on page 10.

Suggestion: Figure 1 on page 3, shows a direct path from Tier 1 to Tier 3 with Department approval. The existence of this pathway is also alluded to in a statement on page 9 that Aif additional pathways are discovered or suspected to be significant, the user should consider them in a Tier 2 or Tier 3 investigation." The Advisory Group suggests including language in the CALM guidance document that will clarify the existence of this pathway.

DNR: Movement directly from Tier 1 to Tier 3 is possible within the CALM framework. For example, indication during the Tier 1 assessment that a quantitative ecological risk assessment is necessary, or that a multi-contaminant groundwater plume is migrating within karst geology, could be used as justification to request department approval for direct progression from Tier 1 to Tier 3 assessment. Language has been added to clarify this pathway in the CALM document.

Section 3.4, on page 11 reads, AThe basis for the Tier 1 assumptions ... grossly misrepresents ..."

Suggestion: The Advisory Group suggests revising this sentence by removing the phrase Agrossly misrepresents" and replacing it with Aare not consistent with." The phrase Agrossly misrepresents" is too strong and is inconsistent with other sentences in the CALM guidance document discussing movement to Tier 2. In addition, the inclusion of such language could be construed as establishing a threshold test for movement to Tier 2 which would serve as a strong disincentive to participate in the VCP.

DNR: The term Agrossly misrepresents" has been replaced with Anot consistent with" throughout the document.

Appendix B, Section 2.1, on pages B1 and B2.

Suggestion: Paragraphs 1, 2, and 6, refer to maximum concentrations. Instead of requiring the use of the maximum concentration, if the site owner takes multiple samples for a single boring, the average for that boring should be used to compare to the Tier 1 tables. The Advisory Group suggests revising the CALM guidance document to include language that would allow the use of the maximum concentration or maximum single boring average concentration.

DNR: The use of sample result averaging within a soil boring column may result in a falsely low apparent soil contaminant concentration. Soil contamination is often present in zones or horizons within the soil column. Averaging analytical results from samples collected within a contaminant plume with those collected above and below it would result in falsely lowering the contaminant concentration. Further, the result of this approach would be entirely dependent on the number of samples collected from each boring. One could theoretically decrease the apparent contaminant concentrations at a site by extending the soil borings well below the plume, and collecting additional Aclean" samples for inclusion in the average. Therefore, the department prefers the collection of discrete samples from each boring, and comparison of the maximum soil concentration with the appropriate STARC value.

Appendix B, Section 3.1, on page B5 reads, AUse of these levels for any purpose other than setting risk-based cleanup targets for remediation of Voluntary Cleanup Program (VCP) sites is not sanctioned by the department and is discouraged."

Suggestion: The Advisory Group does not understand why the use of these levels is discouraged at non-VCP sites. If the levels are protective of human health and the environment at a VCP site (and we agree that they are), the same levels should be protective of human health and the environment at non-VCP sites. It is inherent in the development of risk-based target concentrations that the level of protection provided by a given target concen-

tration not be compromised at any site where the same site-specific conditions exist. Given site X, whether or not the site is in the VCP has no bearing on the protectiveness of the target concentrations. The Advisory Group suggests this language be removed from the CALM guidance document.

DNR: This statement was intended to reflect the department=s current position that CALM will initially be used within the department only for VCP cleanups. The department agrees that cleanup levels which are protective of human health and the environment established using CALM at VCP sites, should be protective for other sites as well. The department recognizes the great potential benefits of a unified approach to cleanup standards in all programs, and the feasibility of using the CALM approach elsewhere within the department is being evaluated. However, certain administrative and regulatory issues need to be resolved prior to a more widespread implementation of CALM. The statement was intended only to prevent requests by the regulated community for the use of CALM in other programs for the time being, rather than to make a statement about the technical soundness of universal application.

Appendix B, Section 3.3, on page B8 reads, A... scenario AB" assumes a child incidentally ingests 0.1 grams of soil, with an exposure frequency of 250 days per year."

Suggestion: This assumption is inconsistent with the definition of Scenario B provided in Section 3.2 (Figure 2) of the CALM guidance document which limits the time children may be on site to less than 180 days/yr. If children are on site less than 180 days/yr, then it follows that the exposure frequency should also be 180 day/yr. Consequently, the Advisory Group suggests revising the CALM guidance document by changing the exposure frequency for a child to 180 days/yr and recalculating all Tier 1 STARCs for Scenario B.

The default soil ingestion rate for an adult in Scenarios A, B and C is listed as 100 mg/day (USEPA, 1991). This value corresponds to the recognized standard soil ingestion rate for an adult in a residential (scenario A) land use setting, but not for either a commercial (scenario B) or industrial (scenario C) land-use setting. For both a commercial and industrial land-use setting, USEPA recommends a standard soil ingestion rate of 50 mg/day (USEPA, 1991). Accordingly, the Advisory Group suggests revising the CALM guidance document to reflect a 50 mg/day soil ingestion rate for adults for scenarios B and C.

DOH: EPA cites several values that can be used for soil ingestion depending on different factors. Although 50 mg/day is listed in the Exposure Factors Handbook, many agencies, including MDOH, consider this value as only appropriate for office workers and other “indoor” employee scenarios. Since it is unknown what workers at future VCP sites may be doing, we

use the 100 mg/day value (that is also EPA guidance). This is not an overly conservative value as it does not protect maintenance workers, grounds keepers, etc. whose default soil ingestion rate is the EPA-recommended 480 mg/day. If the user wishes to move to Tier 2, they may use the lower value if they can demonstrate that all future workers will spend all of their time indoors.

Appendix B, Section 3.3, on page B8 reads, Awhere chemical specific data was not available, the following defaults were used as dermal absorption factors. Volatile Organics 30%, Semi-volatile Organics 10%, Metals 1%, and Pesticides 30%."

Suggestion: The above statement suggests that chemical specific data was used to generate some of the dermal absorption factors. However there is no table presenting this data in the CALM guidance document. For purposes of Tier 2 evaluations, it will be necessary for users to have access to the same chemical specific data that was used to calculate the Tier 1 STARCs. Consequently, the Advisory Group suggests revising the CALM guidance document to include a table of the chemical specific data used to generate the dermal absorption factors.

In addition, the Advisory Group notes that the default dermal absorption factors presented are inconsistent with the latest USEPA guidance. The Advisory Group suggests revising the CALM guidance document to use the following default values if chemical specific absorption values are not available: Volatile Organics 10%, Nonvolatile Organics 1%, and Inorganics 1%.

DOH: The ABS values were inadvertently left out of the parameter table. They will be added to the final.

DOH: The ABS values given for semi-volatiles and inorganics are consistent with the latest EPA policy. The Department of Health uses the Interim Dermal Risk Assessment (1997), which does not list default dermal absorption values for volatiles or non-volatiles. MDOH uses 30% as the dermal default for volatiles and pesticides.

Appendix B, Section 3.3, on page Be reads, Athe skin surface areas used in the calculations were 4714 cm^2 for an adult and 4236 cm^2 for a child.

Suggestion: These values are inconsistent with the latest USEPA guidance which recommends an adult skin surface area of 5000 cm^2 and a child skin surface area of 2000 cm^2, based on 25 percent of the total skin surface area for an adult and child, respectively (USEPA Exposure Factors Handbook, 1996). The Advisory Group suggests revising the CALM guidance document to reflect an adult skin surface area of 5000 cm^2 and a child skin surface area of 2000 cm^2 .

DOH: These values are consistent with EPA guidance. The 5000 and 2000 cm2

values are general defaults. Our values differ from the defaults because we calculated specific age-adjusted, gender-adjusted values and assumed a greater percentage of exposed skin for children.

Appendix B, Section 4, on page B12.

Suggestion: Noncarcinogenic reference doses (RfDs) and carcinogenic slope factors (SFs) are provided for oral, dermal, and inhalation exposure routes. While oral and inhalation human health toxicity criteria are readily available from the USEPA IRIS and HEAST databases, no dermal human health toxicity criteria is available. Dermal RfDs and dermal SFs can be derived based on oral RfDs and oral SFs if data on oral absorption efficiency (OAE) is available. OAE data is available for many chemicals, however, it is not discussed or presented in the CALM guidance document. The Advisory Group suggests revising the CALM guidance document to include information concerning the OAE data used to derive dermal RfDs and dermal SFs.

DOH: OAEs were used in the calculation of the STARC values. These values will be provided in the final document.

Appendix B, Section 5.2, on pages B12 and B13 reads, AThe key to predicting chromium speciation is to examine the source of the chromium."

Suggestion: While the source of the chromium may be informative, it is not necessarily the key to predicting chromium speciation. Rather, it is usually the soil chemistry that is the key. Soil pH and the presence of oxidizing/reducing agents generally control the ionic species present. The Advisory Group suggests revising the CALM guidance document accordingly.

DNR: Agreed. The chromium section has been revised.

Appendix B, Section 5.4, on pages B13 and B14 reads, Athis assumption leads to a more conservative STARC value (660 vs. 690 mg/kg) for Scenario B than that calculated using the assumptions of a child ingesting 100 mg/day soil for 250 days/year."

Suggestion: The definition of scenario B presented in section 3.2 of the CALM guidance (Figure 2), restricts the time children are present on site to no more than 180 days per year. Consequently, the Advisory Group suggests that the STARC value for scenario B be recalculated using an exposure frequency of 180 days per year.

DOH: The 180 days / year in Figure 2 was an error. 250 days was the intended figure. Figure 2 will be corrected in the final document.

Appendix B, Section 5.5, on pages B14 and B15.

Suggestion: The USEPA, in its **PCB Spill Cleanup Policy,** has established a cleanup level for PCBs of 10 ppm for unrestricted access areas (residential land-use scenario (scenario A) and commercial land-use scenario (scenario B)). The Policy defines Aunrestricted access area" as any area other than restricted access or outdoor electric substations, including residential/commercial areas. For restricted access areas (industrial land-use scenario (scenario C)), the **PCB Spill Cleanup Policy** has set a cleanup level for PCB of 25 ppm. Consequently, the Advisory Group suggests revising the PCB STARCs in the CALM guidance document to 10 ppm for scenario A and scenario B and 25 ppm for scenario C.

DOH: The levels provided by EPA in the Spill document are not health-based values, and were originally intended for immediate spill response, not cleanup of historical contamination. The values provided in the CALM document are health-based and appropriate for VCP sites..

Appendix B, Section 6, on pages B15 and B16. Appendix B, Table B1, on pages B19-B24.

Suggestion: GTARCs for toluene, ethylbenzene, xylene and TPH are below EPA MCLs. The Advisory Group suggests revising the Table B1 GTARCs for these contaminants to be consistent with the EPA MCLs. The Advisory Group further notes that although the Department has based alternative standards for these contaminants on empirical evidence that has been found to be protective, this does not mean that higher MCLs would not also be protective. Without scientific evidence backing the use of these lower concentrations, the decision to include them seems to be an arbitrary choice by the MDNR.

DNR: It is the department=s experience with these contaminants that, due to their relatively low toxicity and high mobility, the EPA MCLs are not protective of certain aesthetic qualities and safety concerns. The GTARCs cited in CALM for these contaminants have been found to be protective of these considerations in most situations. The department agrees it is theoretically possible that concentrations between the proposed GTARC and the EPA MCL for these contaminants may also be protective in some cases. However, until additional data and/or research is available to identify those values, use of the proposed GTARCs, which have been demonstrated to be protective, is the most prudent course of action. It should also be pointed out that the EPA MCLs themselves are not necessarily health- or risk-based values. They may also take into consideration aesthetic concerns, feasibility of treatment, and other factors.

Appendix B, Table B1, on page B19.

Suggestion: Cyanide is not listed. Since iron cyanides can be present at FMGP sites, it is not clear how such a compound should be treated under CALM. The Advisory Group suggests revising Table B1 to include cyanide.

DNR: Cyanide was inadvertently left out of the table. This is an important contaminant at some VCP sites and has been added to the table. Due to the lack of some chemical property data, C_{leach} is not yet available for cyanide.

The department should be consulted if contaminants of concern are identified at a site that are not found in the Tier 1 table. The DNR and DOH will attempt to generate Tier 1 STARCs and will provide chemical/toxicological data for upper tier calculations if the data is available to us.

Appendix B, Table B1, on page B22.

Suggestion: C_{IDI} concentrations are not available for naphthalene. The Advisory Group suggests revising the CALM guidance document to include either the C_{IDI} concentrations for naphthalene or an explanation why such concentrations are not present.

DNR: Values for naphthalene were omitted due to a spreadsheet error, and have been included in the final document.

TIER 2 ANALYSIS

Section 3.5, on pages 11 and 12. Appendix C, Section 2.1, on page C4. Tier 2 provides only for consideration of natural Anon-anthropogenic" background concentrations as an alternative to calculated risk-based concentrations.

Suggestion: The Advisory Group is concerned that for some sites located in urban or agricultural settings, constituents will be detected at levels much higher than natural background, but consistent with regional data. For example, in an urban setting, lead and PAHs may be detected due to the proximity of roadways, while in an agricultural setting, pesticides may be detected due to the proximity of cropland. The Advisory Group suggests revising the CALM guidance document to allow for the consideration of these types of anthropogenic sources when determining background soil concentrations. In addition, the Advisory Group suggests that the Department develop a preferred sampling strategy which should include the ability to use statistical methods for determining background concentrations.

DNR: The department does not believe that the presence of anthropic contamination surrounding a given site, regardless of how widespread the distribution is, should have any bearing on the cleanup level determined for that site. Sites should be cleaned up to levels protective of human health and the environment, independent of the condition of surrounding properties. Allowing cleanup levels to be set based on surrounding anthropic

contaminant levels may tend to result in cleanups to the lowest common denominator, which would tend to perpetuate the cycle of regional contamination, particularly in our cities. The only exception is in the relatively rare situations where contaminants (primarily heavy metals) are present naturally in native geologic materials above health based cleanup levels. Only in these instances may cleanup levels take background concentrations into consideration.

Statistical methods are allowed and encouraged by the VCP for determining background levels. In practice, the majority of VCP sites are relatively small and volunteers are often unable or unwilling to collect and analyze the number of samples required for statistically significant analyses. This goes for both background and contaminated areas. As a result, background calculations are often done by averaging a relatively small number of samples. Development of a standard method will be considered in the future; for the time being, proposals will be considered on a site-specific basis.

Section 3.6, on page 13 reads, ANote: if Tier 2 STARC values (calculated using site-specific data in place of the assumptions made at Tier 1) are lower than the Tier 1 STARC values, the user **does not** have the option of cleaning up to the higher Tier 1 STARC values."

Suggestion: This requirement is inconsistent with a major premise of the overall approach adopted within the guidance to develop risk-based cleanup levels. Cleanup objectives developed under Tier 1, Tier 2 or Tier 3 are equally protective of human health and the environment. By definition, Tier 1 cleanup levels are generated using very conservative assumptions in order to provide a high level of protection of human health and the environment at each site. Also, by definition, Tier 2 cleanup levels are neither more nor less protective than Tier 1 values. Therefore, remediation to Tier 1 cleanup levels would not sacrifice any level of protection for human health and the environment, even if Tier 2 STARC levels are lower.

The Advisory Group suggests this requirement be revised to provide the user with an option of cleaning up to the higher Tier 1 STARC values if the Tier 2 cleanup objectives are lower.

DNR: One of the goals in setting up CALM=s tiered approach was to achieve an equal risk level for cleanups conducted under all three tiers. However, since the Tier 1 lookup table values must be based on default assumptions, it is not possible to absolutely guarantee that this will be the case. Once a participant has employed site-specific information to develop a Tier 2 cleanup level, the presumption is that the cleanup level is more accurate since it is based on actual site data rather than the default assumptions used at Tier 1. It is theoretically possible that a Tier 2-derived cleanup level could be

lower than the Tier 1 cleanup level for a given contaminant. This should be the rare exception because the department purposely chose default assumptions that were very conservative. If this does occur, it simply means that the Tier 1 assumption(s) do not accurately represent site conditions at a particularly unusual site. Therefore the cleanup level determined at Tier 2 using site-specific data should be used. In this instance, the department will not approve the use of a higher Tier 1 cleanup level, because at that point it would have been demonstrated to be based on assumptions which do not represent site conditions. Of course if the user develops Tier 2 cleanup levels which are higher than the corresponding Tier 1 numbers, they are free to use either cleanup level in meeting the remediation goals for the site. Tier 2 should not be used solely to obtain less stringent cleanup standards. It is intended to develop goals more appropriate for the site conditions.

Appendix C, Section 2.6, on page C7 reads, ASubsurface conditions at the site are not grossly misrepresented by..."

Suggestion: The Advisory Group suggests revising this sentence by removing the phrase Agrossly misrepresented by" and replacing it with Ainconsistent with." The phrase Agrossly misrepresented by" is too strong serves as a strong disincentive to participate in the VCP.

DNR: The term Agrossly misrepresents" has been replaced with Anot consistent with" throughout the document.

Appendix C, Section 2.6, on page C7 reads, Amonitoring for a certain period may be used to verify the prediction of the model; ...decrease to levels consistently below GTARC."

Suggestion: The Advisory Group suggests revising the CALM guidance document to include criteria for determining that contaminant levels are Aconsistently below GTARC." In addition, the Advisory Group suggests revising the CALM guidance document to clarify that monitoring should be conducted on an aquifer basis.

Appendix C, Section 2.7, on page C8 reads, A... if the leachate concentration does not exceed GTARC..."

Suggestion: Comparing the results of the leach tests directly to the GTARC value is inappropriate and inconsistent with Formula (15) in Appendix A, on page A4. The Advisory Group suggests revising the CALM guidance document to indicate that leaching tests results should be compared to the GTARC multiplied by the dilution factor as outlined in Formula (15).

DNR: Both the TCLP and SPLP laboratory leaching procedures employ a weight of leaching fluid approximately 20 times the weight of the soil sample. The department believes that this is analogous to the concept of the dilution factor (DF) used in developing the GTARCs in CALM Appendix A. Since the laboratory test itself introduces a 20 fold dilution (which is equivalent to the default assumption of DF=20 in Appendix A), it is not necessary to multiply the Table B1 GTARC by 20 prior to comparing it to the results of the laboratory leaching test as suggested above.

Appendix C, Section 2.10, on pages C9-C11.

Suggestion: Chromium - At Tier 2, speciation analysis for Cr^{+3} and Cr^{+6} is allowed. It is usually not necessary to speciate every sample to make this determination. A percentage of samples is usually sufficient. The Advisory Group suggests including language in the CALM guidance document that will clarify the sampling requirement.

DNR: We agree that all samples do not need to be speciated. However, sites require widely varying amounts of sampling, so a standard percentage may be infeasible. A selection of samples would certainly work for larger sites. Changes have been made to allow on a site-specific basis.

Copper - It is not clear why modification of the Tier 1 values for copper is limited to comparison with local background concentrations. While the Advisory Group agrees that background concentrations should be considered, it also believes modification of the default formula parameters using site-specific data, such as soil properties, should be permitted. It is explained in Appendix B, on page B13, that since there was no published reference dose for copper various assumptions were used to calculate a reference dose for copper of 0.037 mg/kg/day. This value, in turn, was used to generate the Tier 1 STARC value for copper. The Advisory Group does not see any reason why this same reference dose for copper of 0.037 mg/kg/day can not be applied to site-specific data in Tier 2 to calculate Tier 2 STARCs. Consequently, the Advisory Group suggests revising the CALM guidance document to allow modification of the default formula parameters using site-specific data in Tier 2.

DNR: The Tier 2 possibilities for copper are the same as most other compounds, but this was not stated correctly in the draft. DOH agrees that Tier 2 calculations can be made for Cu as suggested. The document has been changed accordingly.

Lead - It is indicated that Achanges to the lead target concentrations cannot be made at Tier 2." In accordance with Appendix G, if an approved engineered barrier is used at a site, the Tier 2 target cancer risk

and target hazard index may be increased to $1x10^{-3}$ and 100, respectively. In this case, the engineered barrier provides a level of protection which allows concentrations of chemicals to exceed the Tier 1 STARCs that were based on target cancer risks and target hazard indices of $1x10^{-5}$ and 1, respectively. Although it is understood that the Tier 1 STARC for lead was not calculated using a target cancer risk or target hazard index, the concept of equivalent levels of protection is still applicable. Given the presence of an engineered barrier, there may be some cases in which concentrations of lead exceeding the Tier 1 STARCs may still be protective of human health. Consequently, the Advisory Group suggests revising the CALM guidance document to allow the modification of lead target concentrations at Tier 2.

DNR: We agree that engineered barriers generally should allow higher levels to be left in place, and this will be taken into account for alternatively derived contaminants such as lead. It will not be done by changing the cancer risk or hazard index values, as discussed elsewhere in this document. DOH feels that the data requirements for site-specific analysis with the IEUBK model for lead are quite detailed, and that VCP participants would be unlikely to pursue that avenue. They will continue to look at ways of making Tier 2/3 available for lead-contaminated sites.

Polynuclear Aromatic Hydrocarbons - The relative potency factors for the carcinogenic PAHs presented on page C12 are somewhat different than the values established by USEPA and typically used in risk assessments (USEPA, 1993). The Advisory Group recommends using the following relative potency factors to determine Tier 2 STARCs for carcinogenic PAHs:

Benzo(a)anthracene	0.1
Benzo(a)pyrene	1.0
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

DOH: The values used in the CALM document are identical to the EPA values, except that they are rounded to two significant digits instead of the nearest power of ten.

Appendix C, Table C1, on page C13.

Suggestion: Table C1 shows that the first order degradation constant (ë) may be measured in the field. Although it may be possible to conduct a field experiment to determine ë on a site-specific basis, the cost for such a study would likely be prohibitive. The values for ë are primarily based on constituent physical/chemical properties and are not likely to vary much based

on site specific conditions. The Advisory Group suggests removing ë from the list of parameters which may be modified at Tier 2 based on field measurements and further suggests that values for ë be determined based on data in the available literature.

The Advisory Group also suggests that AF, K_{oc}, Q/C, THI, and TR, be added to the list of parameters that may be modified in Tier 2 based on site-specific data.

DNR: The first order degradation constant (ë) is listed both in Tables A2 and C1 as a parameter that the user <u>may</u> modify at Tiers 2 or 3 using site-specific data. It is not a requirement that site-specific values be used at all sites evaluated using Tier 2 or 3. The department disagrees that ë values are primarily based on chemical properties of the contaminant, and are not likely to vary much from site to site. Quite the opposite is true. The degradation constant not only may vary by orders of magnitude from site to site, it may do so over fairly short distances within a single contaminant plume at a given site. In fact, this parameter is predominantly controlled by site conditions (redox conditions, pH, availability of electron donors and electron acceptors, conductivity, moisture, etc.). Although literature values for ë will be considered, the site conditions under which the literature values were collected must be compared to the conditions at the subject site. Where these conditions significantly differ, the department will recommend that a site-specific degradation constant be determined. Fairly inexpensive methods are available for determining ë in the field using relatively low technology analyses, and readily obtainable data.

DOH: We agree that Koc should be added to the list of parameters. The other parameters will not be added to the modifiable list.

TIER 3 ANALYSIS

Section 3.7, on page 13 reads, ATier 3, in general, can be a **substantial increase** in effort relative to Tiers 1 and 2, as the evaluation is **much more complex** and may include ... **sophisticated contaminant fate and transport models**." (Emphasis added)

<u>Suggestion:</u> The Advisory Group is concerned that this language unduly suggests that a Tier 3 evaluation may be much more costly to complete. Based on the examples of Tier 3 evaluation activities presented in Appendix D of the CALM guidance document, this is not necessarily the case. Some Tier 3 evaluations may require relatively the same level of effort as required in Tier 2. Tier 3 evaluations may, for example, include simple modifications of parameters not allowed under Tier 2, or use of toxicological information not allowed in Tiers 1 and 2. These types of activities may require little additional effort relative to Tier 2.

The Advisory Group suggests that a broader perspective be pro-

vided in the CALM guidance document, including language indicating the broad range of effort required to conduct a Tier 3 evaluation. It should be stressed that for some Tier 3 evaluations, the effort expended may not match the effort required than in Tiers 1 or 2, while other evaluations may require substantially greater effort.

DNR: The department acknowledges that Tier 3 evaluations will not always involve more costly analyses and a much greater level of effort. This will be made more clear, by addition of language to the Tier 3 appendix. However, the department does intend for Tier 3 to be reserved for more complicated sites including those with more extensive contamination and/or complex hydrogeology. Therefore, it is anticipated that the majority of Tier 3 analyses will be more costly and data-intensive than Tier 1 or Tier 2 assessments. Note that all Tier 3 risk assessments must be reviewed and approved by DOH.

Section 3.7, on page 15 (last bullet in top text box). It is suggested that a health profile of the surrounding area may be required as part of the Tier 3 evaluation.

Suggestion: The Advisory Group believes that it is inappropriate to require a health profile for any site in the VCP. The practical purpose of a health profile is to provide a means of identifying any change in the gross health status of a population that could possibly be associated with a release from a facility. To be an effective tool, a baseline evaluation of the health status of the population surrounding a facility must be completed prior to any release. Then, at some point in time after a release occurs, any change in the health status can be identified by making a comparison with the baseline conditions. Consequently, the utility of a health profile is limited to facilities that are required to obtain a permit prior to operation. Since the MDNR CALM guidance is only applicable to VCP sites, the performance of a health profile would serve no practical purpose and creates an unnecessary disincentive for potential participants.

DNR: The term Ahealth profile" was not correctly used in the draft. The intent was to allow for the use of local data on morbidity, mortality, and natality in populations near the site to be used in a Tier 3 analysis as an indicator of potential impact of the site on human health. However, Ahealth profile" is generally taken to mean something entirely different as described in the above suggestion. The phrase has been removed to avoid confusion.

Appendix D, Section 1.1, on page D1.

Suggestion: Section 1.1 (A) lists conditions when Tier 3 may be used. The Advisory Group suggests adding the following conditions:

Sites with constituents that are not included in the Tier 1 lookup table.

Sites where development of alternate groundwater GTARC values is warranted.

In addition, the second bullet refers to additivity, but no method for evaluating additivity is included in the CALM guidance document.

Finally, the seventh bullet uses the phrase,Agrossly misrepresent." TheAdvisory Group suggests revising this sentence by removing the phrase Agrossly misrepresent" and replacing it withAare not consistent with." The phrase Agrossly misrepresents" is too strong and could be construed as establishing a threshold test for movement to Tier 3. TheAdvisory Group also believes that the inclusion of such language serves as a strong disincentive to participate in the VCP.

DNR: Contaminants not included in the Tier 1 lookup table may be evaluated at any of the Tiers. Once toxicological and chemical property data is identified, the Tier1/Tier 2 equations could be used either with the Tier 1 default assumptions, or with Tier 2 site-specific data to calculate cleanup levels. Therefore, it is not necessary to specify this as a condition warranting progression to Tier 3.

The second suggestion regarding alternate GTARCs will be added to Section 1.1 (A) of Appendix D.

Regarding additivity, DOH feels that 1) Sufficient toxicology data does not yet exist for the additive/synergistic/antagonistic effects of the many combinations of contaminants to allow the inclusion of this effect in Tier 1 at this time, and 2) there is enough conservatism already built into the Tier 1 assumptions and slope factors to provide a safety margin until this branch of the science is more thoroughly investigated. Reasonable methods may be proposed by the user in Tiers 2 and 3.

The phrase Agrossly misrepresents" has been replaced withAnot consistent with".

Appendix D, Section 2, on page D2 reads, AThe Tier 2 rules apply requiring the use of actual site data, rather than regional or generic values."

Suggestion: The above statement is in reference to the discussion of site-specific considerations allowed to be modified in Tier 3. TheAdvisory Group is unclear of the extent to which the above prohibition on the use of regional and generic values applies to Tier 3. This same prohibition on the use of regional and generic values is also discussed in the section of CALM relating to Tier 2, but only in the context of geologic properties. It is assumed that this is also what is intended in Tier 3. The Advisory Group suggests including language in both the section describing Tier 2 and Tier 3 to clarify that the limitation on the use of regional and generic values

should apply to geologic properties, since a parameter such as wind speed is realistically available only on a regional basis.

DNR: The department prefers the use of local empirical data where available over data derived from regional estimates. For some parameters, it will not be practical or even desirable to obtain local data. Site-specific data is preferred whenever feasible, and that the department may specifically request that local (site-specific) data be collected where regionally derived data is insufficient to properly characterize the site. This intent has been clarified in the document.

Appendix D, Section 2.2, on page D5.

Suggestion: There is a section header for Section 2.2, however, there is no text. The Advisory Group suggests including language in the CALM guidance document to clarify the intent of this section.

DNR: This was an oversight. The section has been filled in.

Appendix D, Section 2.5, on page D6 states that one criteria for the use of alternate groundwater cleanup standards is thatAthe proposed alternate GTARCs are protective of human health to a minimum cancer risk level of 10^{-5}, and a hazard index of 1 for non-carcinogenic contaminants, and are protective of ecological receptors."

Suggestion: Since the details of a Tier 3 analysis in which alternate groundwater cleanup levels may be proposed may vary widely, it is possible that engineered barriers and institutional controls may provide an additional margin of safety that may justify the approval of a higher acceptable cancer risk level and noncarcinogenic hazard index. Consequently, the Advisory Group suggests revising the CALM guidance document to eliminate these references to a specific cancer risk level and noncarcinogenic hazard index and changing the text to read, AThe proposed alternate GTARCs are protective of human health and ecological receptors."

DNR: The department agrees that the use of engineered barriers and institutional controls may reduce the risk posed by groundwater contamination at a given site. However, this is a separate concept from the risk level used to set cleanup targets. The department, in consultation with the Department of Health, has selected the risk levels acceptable to protect human health and, we presume, the environment. The cleanup targets for all tiers at each site will be based on the same target risk level: 10^{-5} for carcinogens, hazard index of 1 for non-carcinogens. Doing so helps ensure that the cleanup will result in acceptable residual risk to human health and the environment. Engineering controls do allow for higher contaminant levels to remain in place. This is discussed in the Engineering Controls Appendix and elsewhere in these comments.

Appendix D, Section 2.5, on page D6 states that one criteria for the use of alternate groundwater cleanup standards is that the Ause of the proposed alternate GTARCs will not result in off-site migration of contaminants at levels above the Tier1/Tier2 GTARC values."

Suggestion: There may be a situation in which there is no exposure to groundwater beyond the site boundary (i.e., there is no exposure to receptors). For example, a local ordinance may prohibit the installation and use of groundwater wells, or may require that any household or business be connected to the local water supply system. In this case, it could be demonstrated that there is no current exposure to the groundwater and that future use is prohibited. In such a case, the nearest down gradient receptor to the groundwater may actually be at a point where groundwater discharges to the surface (e.g., a creek , stream, river, pond, or lake). Depending on the specific distance to this offsite surface water receptor, and the chemicals of concern, it is possible that off-site migration of contaminants at levels above the Tier 1/Tier 2 GTARC values may not present any adverse risk to human health or the environment. Consequently, the Advisory Group suggests deleting this criteria from the CALM guidance document.

DNR: Groundwater is included in the definition of waters of the state. As such, it is covered by the antidegradation policy described in the Water Quality Regulations (10 CSR 20-7-031). It is the department=s policy, therefore, not to approve contaminant migration into groundwater off-site at levels above the state Water Quality Standards for groundwater, which have been used up to this point at VCP sites and have been adopted as Tier1/Tier 2 GTARCS in CALM.

There are some issues here that are unique to the VCP. The VCP oversees cleanup of properties whose boundaries are specifically defined upon entry into the program, as opposed to other programs such as Superfund, which defines the site as the extent of contamination regardless of property boundaries. In CALM, the department is allowing more flexibility than in the past to address groundwater contamination at VCP sites by allowing contaminant levels above the Water Quality Standards to remain in place, within the limitations described in Appendix D (regarding no off-site migration, modeling, monitoring, etc.). However, this flexibility applies only to the parcel of property enrolled in the VCP. Where off-site groundwater contamination is found to occur, the program requires, at minimum, that all affected and potentially affected adjacent property owners be notified. The department encourages cleanup of any off-site contamination (soil or groundwater) found to originate from a VCP site, and will provide oversight for this cleanup if requested. However, as a voluntary program, the VCP cannot require cleanup of off-site properties. The VCP participant retains environmental liability (through applicable state and federal laws and

regulations, and possible third party claims) for any off-site contamination they choose not to voluntarily address. It also not be prudent for the department to Asanction" the potential future contamination of offsite property adjacent to a voluntary cleanup site by allowing site closure based on modeling that predicts that offsite migration can or will happen in the future.

DOH: Local ordinances can change, therefore, neither the VCP participant nor the state can reasonably guarantee that the POE will not change. We also feel it is bad stewardship to allow degradation of groundwater just because no one is currently using it. Changing this policy could be construed as state approval of contaminating someone else's groundwater.

Appendix D, Section 2.6.

Suggestion: This section is missing.

DNR: The sections were mislabeled and have been corrected.

Appendix D, Section 2.7, on pages D6 and D7.

Suggestion: A distinction should be made between the APoint of Compliance" (POC) and the APoint of Exposure" (POE). The term APoint of Exposure" is not used in the CALM guidance document. For practical purposes, the POC could be established anywhere on site. From a risk assessment perspective, the POE is more important in determining the ultimate cleanup objective because it is at this point where a risk can be determined. The Advisory Group suggests revising the CALM guidance document to include the following language:

AThe point of exposure (POE) is the point at which it is assumed a potential receptor can come in contact with the contaminated groundwater, either now or in the future. The nearest down gradient human/ecological receptor point (whether it is located onsite or offsite) is the POE. Understanding and identifying the spatial relationship between the POC and POE is critical in the establishment of an alternate groundwater cleanup objective. Mechanisms that attenuate contaminants should be considered between the POC and the down gradient POE. If the POE is established at the POC, then no attenuation between the POC and POE should be considered. However, if the POE is located a specified distance from the POC, then appropriate and conservative estimates of contaminant attenuation may be used in calculating the alternate groundwater cleanup standard. These mechanisms of attenuation should only be considered over that distance between the POC and the POE. GTARC values should be developed that are protective of human/ecological receptors at the point of exposure. The point of compliance would likely be some point on site that would be monitored for

constituent concentrations exceeding a calculated level that would in turn

be protective of the point of exposure."

DNR: For the reasons outlined in earlier comment responses regarding alternate groundwater target concentrations (GTARCs), the department will not approve of the migration of off-site contamination at levels above the STARC or Tier 1/Tier 2 GTARCs. Therefore, the point of compliance may never be further downgradient than the property boundary, regardless of the locations of actual off-site point(s) of exposure. If, however, a point of exposure (POE) occurs between the contaminant source and the downgradient property boundary, the point of compliance should be set at that POE. This is stated in Appendix D of the CALM document, although the term POE was not used. This term will be included in CALM to clarify the department=s position.

Appendix D, Section 2.7, on page D7 states that Athe CALM user may not buy compliance by buying adjacent property, thereby extending the distance from the source to the point of compliance. Use of this strategy by a VCP participant either while in the program, or before applying to the program is sufficient grounds for the department to deny a proposal for evaluation of the site under Tier 3."

Suggestion: The purchase of adjacent property can neither change the location of the source nor the location of the point of exposure. Therefore, from a risk assessment perspective the purchase of adjacent property would not be expected to have any impact on the development of alternate groundwater cleanup standards. In addition, the purchasing of adjacent property may not be intended to Abuy compliance", but may be a consequence of a long term strategic business plan. Therefore, to categorically deny a proposal for evaluation of a site under Tier 3 based on this criteria would be inappropriate. The Advisory Group suggests removing this language from the CALM guidance document.

DNR: While it is true that the purchase of adjacent properties does not change the source location or point(s) of exposure, it could change the point(s) of compliance. The distance between the source and the point of compliance is an input variable in the Tier 1/Tier 2 formulas 20 and 21 (Appendix A). Therefore the addition of adjacent properties to the Asite" could alter the calculated cleanup levels. This distance would also likely be used in Tier 3 modeling applications to determine contaminant fate and transport characteristics. The department does agree that it is not possible to determine the intention of VCP participants conducting land transactions surrounding a given site, and it is not the role of the department to become involved in such transactions. Therefore, this language will be removed from the CALM document.

DOH: The Point of Exposure is the closest location where human exposure is occurring. The POE could change tomorrow if someone drills a new well.

In addition, using a distant POE as the compliance point is tantamount to approving the contamination of someone's else's groundwater. For this reason, the Point of Compliance can be no farther than the property boundary.

REMEDIAL ACTION

Section 3.9, on page 17 (5th bullet in bottom text box).

Suggestion: Performance standards and criteria for measuring success are not defined. The Advisory Group suggests including language in the CALM guidance document that will adequately explain what are acceptable methods for measuring success. Among the methods allowed, the Advisory Group suggests that statistical analysis of confirmation sampling results be included.

DNR: The department intends to include verification sampling and performance criteria in the site assessment/characterization (SAC) guidance document. **It is expected that statistical approaches for confirmation sampling will be provided in this guidance document. In the mean time, the department will continue to consider proposals for specific performance standards and criteria related to confirmation sampling on a site specific basis.**

Section 3.9, on page 18.

Suggestion: Confirmatory sampling is required during implementation of the RAP to indicate whether contaminant concentrations are below the target cleanup levels. However, there is no guidance as to how attainment is to be measured. The Advisory Group suggest including language in the CALM guidance document that will adequately explain how attainment is to be measured. Among the methods allowed, the Advisory Group suggests that statistical evaluations, such as those outlined by EPA=s Center for Environmental Statistics, be included.

DNR: The department intends to include verification sampling and performance criteria in the site assessment/characterization (SAC) guidance document. **It is expected that statistical approaches for confirmation sampling will be provided in this guidance document. In the mean time, the department will continue to consider proposals for specific performance standards and criteria related to confirmation sampling on a site specific basis.**

Section 3.9, on page 19.

Suggestion: The parenthetical phrase Aalready at Tier 3" in paragraph D1(b) is unclear in this context. The Advisory Group suggests either adding lan-

guage to the CALM document to clarify the Department=s intent or remove the parenthetical phrase.

DNR: The phrase should read Aunless already at Tier 3". This change has been made in the document.

Section 3.9, on page 19.

Suggestion: While this section discusses the use of groundwater monitoring to demonstrate whether contaminant levels have decreased below the cleanup criteria. The Advisory Group suggests including additional language in the CALM guidance document to adequately explain how such a determination is to be made. Among the methods allowed, the Advisory Group suggests that statistical analysis be included.

DNR: The department intends to include verification sampling and performance criteria in the site assessment/characterization (SAC) guidance document. It is expected that statistical approaches for confirmation sampling will be provided in this guidance document. In the mean time, the department will continue to consider proposals for specific performance standards and criteria related to confirmation sampling on a site specific basis. For groundwater, the VCP has historically required that sampling of all monitoring wells for some agreed upon monitoring period must demonstrate that all contaminant levels are below the groundwater cleanup level in all monitoring wells.

REFERENCES

Section 4, on pages 22-26. Several of the references cited are outdated and have been updated.

Suggestion: The Advisory Group believes the CALM guidance document should meet the highest standard of risk assessment practice and be consistent with the latest USEPA guidance. The following are examples of some of the outdated references listed in section 4:

1. USEPA, 1989b. Exposure Factors Handbook, has been revised and updated (USEPA, 1996).
2. USEPA, 1992b HEAST, has been revised and updated (USEPA, 1997).
3. USEPA, 1993b. Integrated Risk Information System is updated monthly (USEPA, 1998).

To the extent that these outdated references, some **five years old**, were used to develop the CALM guidance document, the Advisory Group strongly suggests the Department incorporate the latest USEPA guidance in the final CALM guidance document.

DOH: The August 1996 Exposure Factors Handbook was a draft version. The Missouri Department of Health used it and the older official version. The

reference list will be updated to list both versions. MDOH used the 1995 version of HEAST along with the older version as some information was only available from the older version. Neither MDOH nor EPA Region 7 has an official 1997 version as of this writing. The listing for the one IRIS citation was of the main copyright date. IRIS was checked for the values used in this document over several months, with a last review in March 1998. This date will be listed in the IRIS footnote. The outdated references listed in Section 4 have been updated.

TIER 1/TIER 2 FORMULAS, VARIABLE DEFINITIONS, AND ASSUMPTIONS

APPENDIX A, TABLE A1

Page A2 (Formulas 1 and 2).

Suggestion: Formulas 1 and 2 provide equations for calculating STARC for the combined ingestion/dermal contact/inhalation pathway. Formulas 4-9 provide equations for calculating STARC for the individual pathways (ingestion, dermal contact, and inhalation). Presumably, formulas 4-9 are to be used when exposure pathways are eliminated. Obviously, if two of the three exposure pathways are eliminated STARC values could be calculated directly from formulas 4-9. It is unclear, however, how STARC values are to be calculated when only one of the three exposure pathways are eliminated.

The Advisory Group suggests formulas 1 and 2 be revised by removing the equation terms AIngestion," AInhalation," and ADermal" and replacing them with references to formulas 4-9. With this change, formulas 1 and 2 can now be used to describe the calculation of STARC for noncarcinogens and carcinogens in general, regardless of which pathways are present or which pathways have been eliminated. If pathways are eliminated, those terms simply can be dropped from the equations.

Formula 1

Formula Description: STARC for Noncarcinogenic Contaminants (mg/kg)

$$C_{IDI} = \frac{THI * AT_n}{(C_{ING} + C_{DER} + C_{INH})}$$

Where: C_{ING} is calculated using formula 4.

C is calculated using formula 5.
C_{INH}^{DER} is calculated using formula 6.

Formula 2

Formula Description: STARC for Carcinogenic Contaminants (mg/kg)

$$C_{IDI} = \frac{TR * AT_c}{(C_{ING} + C_{DER} + C_{INH})}$$

Where: C is calculated using formula 7.
C^{ING} is calculated using formula 8.
C_{INH}^{DER} is calculated using formula 9.

Page A3 (Formulas 4-9).

Suggestion: In order for a site to fall within the definition of Scenario B provided in Section 3.2 (Figure 2) of the CALM guidance document, public access to the site must be limited to non-routine visits with children at no time on the site for more than 180 days/yr. The default exposure frequency for Scenario B sites, therefore, is 250 days/yr for adults and 180 days/yr for children. Formulas 4-9 do not reflect this variation in exposure frequency between adults and children.

Consequently, the Advisory Group suggests formulas 4-9 be revised as follows:

Formula 4

Formula 5

Formula 6

Formula 7

Formula 8

Formula 9

DOH: The use of 180 days/year for children exposed in scenario B (Figure 2) was in error. The value for both adult and children is 250 days/year.

Page A4 (Formula 12).

Suggestion: The soil-water partition coefficient, K_d, for ionizing organic chemicals is dependent on pH and therefore cannot be accurately reflected as shown in formula 12. The Advisory Group suggests that K_d for both ionizing organics and metals be based on literature derived values.

DNR: The Kd values for ionizing organic chemicals used to derive the lookup table TARCs were in fact based on literature values for neutral pH conditions (pH=7.0). This will be clarified in the text and in formula 12. pH-specific values may be used if the site pH is determined. See Appendix C, section 2.3.

DOH: The Kd formula used is USEPA guidance.

Page A4 (Formula 13).

Suggestion: This formula provides the calculation for determining the contaminant saturation level in soil for a single chemical contaminant with the intent of determining the concentration above which the contaminant exists as separate phase liquid product. This equation does not address the situation where the contaminant is present as part of a mixture (e.g., tar). This equation is significant where the chemical concentration calculated by it is lower than the soil values for ingestion, dermal contact and inhalation or leaching to groundwater. In this situation the saturation concentration becomes the Tier 1 STARC. The Advisory Group suggests including language in the CALM guidance document limiting the use of Formula 13 to situations where non-mixtures are present. Further, the Advisory Group suggests revising the CALM guidance document to include alternative provisions suitable for mixtures (i.e., calculations or laboratory test).

DNR: C_{sat} is intended to protect against free phase occurrence of single contaminants, and is not applicable in all situations. While CALM takes a fairly conservative approach, we recognize that sites with complex mixtures at

high concentrations (such as coal tar or petroleum) must be evaluated individually. In the case of a coal tar site, the relatively low cleanup requirements for carcinogenic PAHs will probably result in sufficient cleanup to ensure that free phase tar is not left in place anyway. Based on past experience, it is unlikely that anything approaching free liquids could be present without exceeding some non-Csat target such as C_{leach} or C_{IDI} for some component.

DOH: Limiting the saturation concentration criteria to non-mixture situations would be undesirable. In many cases, mixtures will increase the mobility of some chemicals. If the calculated C_{sat} value were not used, C_{IDI} would be too high to protect against the mobilization of one contaminant by another. For example, consider a site contaminated with high levels of a solvent as well as low levels of other contaminants such as PCBs. Ignoring C_{sat} for the solvent in such a case may lead to mobilization of the PCBs by the solvent that is left in place above saturation concentrations.

Page A5 (Formula 20).

Suggestion: This formula uses the linear average groundwater velocity (U) without correcting for the retardation of organic chemicals by soil. The recommended equation uses this velocity divided by the chemical-specific retardation coefficient (R). This modified version of equation 20 can be found in the USEPA Bioscreen Model (EPA/600/R-96/087: **Bioscreen User=s Manual: Version 1.3**, at page 41. With respect to FMGP sites, correcting for soil retardation is essential to more accurately estimate the groundwater migration of many of the FMGP

organic chemical contaminants. The Advisory Group suggests revising the Formula 20 accordingly.

DNR: Retardation was inadvertently left out of formula 22 (which is used in Formula 20), and has been added.

Page A6 (Formula 22).

Suggestion: There appears to be an error in this formula. The Advisory Group suggests the formula be changed as follows:

$$U = \frac{K \frac{dh}{dx}}{\theta_t}$$

Where θ_t is total porosity, with $\theta_t = \theta_a + \theta_w$.

DNR: The equation erroneously included water-filled porosity(θ_w) rather than total porosity (θ_t), and has been corrected as suggested.

APPENDIX A, TABLE A2

Page A7 (ABS - Absorption Fraction).

Suggestion: The default value is listed as 1 for all scenarios. The Advisory Group suggests that the default value be based on chemical specific absorption values. If chemical specific absorption values are not available, the Advisory Group suggests revising Table A2 so that the default value can be determined by type of chemical as follows:

Volatile Organics	10%
Nonvolatile Organics	1%
Inorganics	1%

DOH: The oral default values are 1. This error has been corrected in the final.

DNR: Table A2 erroneously lists a value of 1 for the default absorption fraction (ABS). The default value for this formula variable is chemical-class-specific as described in Appendix B Section 3.3.
OAE was in fact used but not shown in the equations. This has been rectified.

Columns for OAE and ABS have been added to Table A4. Chemical-specific information was limited, so the default parameters were used for most contaminants.

Page A7 (AF - Adherence Factor).

Suggestion: The default value is listed as 1 mg/cm^2 for all scenarios. USEPA, in the new Exposure Factors Handbook (USEPA, 1996), has altered its methodology for determining the Adherence Factor. Adherence Factor is now activity and population specific. The Advisory Group suggests adopting USEPA=s default value of 0.2 mg/cm^2.

In addition, this parameter has been designated as one that can not be modified in Tier 2. Since the adherence factor is a function of soil type which is a site-specific condition, the Advisory Group suggests revising Table A2 to allow the modification of this parameter in Tier 2.

DOH: Again, the 1996 version of the Exposure Factors Handbook was a draft. The value of 0.2 mg/ cm^2 is actually from the 1997 Interim Dermal Risk Assessment Guidance document. This value is the central tendency for a child. The high end adherence factor default is 0.8 mg/ cm^2. In the studies for which these values were based, it was found that soil adhered more strongly to the lower legs, feet, and hands, with values of 1.0, 1.0 and 3.0, respectively. The CALM scenario assumes that the majority of the surface

area exposed is from the legs and feet, and that children's hands are the primary point of contact. We used a value of 1.0 mg/cm^2. The future activity and population factors at these sites can not be known at this time; therefore, the default should be used.

Many factors, including soil type, can effect the adherence of soil. Knowing the type of soil does not guarantee knowing the adherence of that soil. Other factors, including moisture content, humidity, exposure duration, etc. can alter adherence within soils of the same type. For this reason, we prefer to use the default adherence factor.

Page A7 ($á_x$ - Longitudinal Dispersivity).

Suggestion: Longitudinal dispersivity is a function of the distance from the source to a receptor or point of compliance. Since this parameter is not used in Tier 1, and is dependant on site-specific conditions, the Advisory Group suggests revising Table A2 to allow the modification of this parameter in Tier 2.

DNR: As indicated in Table A2, dispersivity is already allowed to be modified at Tier 2. The inclusion of default values in Table A2 for dispersivity, however, was in error. Dispersivity is only used when calculating a STARC for the leaching to groundwater pathway with a distant point of compliance (as described in Appendix C Section 2.6). This may only be done at Tier 2. Therefore, the default dispersivity values in Table A2 have been removed.

Page A7 ($á_y$ - Transverse Dispersivity).

Suggestion: Transverse dispersivity is a function of the distance from the source to a receptor or point of compliance. Since this parameter is not used in Tier 1, and is dependant on site-specific conditions, the Advisory Group suggests Table A2 be revised to allow the modification of this parameter in Tier 2.

DNR: See response to previous suggestion.

Page A7 ($á_z$ - Vertical Dispersivity).

Suggestion: Vertical dispersivity is a function of the distance from the source to a receptor or point of compliance. Since this parameter is not used in Tier 1, and is dependant on site-specific conditions, the Advisory Group suggests Table A2 be revised to allow the modification of this parameter in Tier 2.

DNR: See response to previous suggestion.

Page A7 (BW_c - Body Weight for a child).

Suggestion: Although it is generally agreed that 15 kg is the standard default body weight for a child, an inherent assumption of Scenario C is that children will not be present onsite and therefore not subject to possible exposure. The Advisory Group suggests revising Table A2 by changing the default value for this parameter to N/A (not applicable) for Scenario C.

DNR: Agreed.

Page A7 (EF - Exposure Frequency).

Suggestion: In order for a site to fall within the definition of Scenario B provided in Section 3.2 (Figure 2) of the CALM guidance document, public access to the site must be limited to non-routine visits with children at no time onsite for more than 180 days/yr. The default exposure frequency listed for sites classified as scenario B is 250 days/yr. While it is generally agreed that this is the appropriate exposure frequency for adults at scenario B (commercial-type) sites, it fails to recognize the limited presence of children. The Advisory Group suggests the Department include a new exposure frequency parameter, EF_c which should be 180 days/yr for scenario B sites. This suggestion is necessarily tied to the previous suggestion that formulas 4-9 be modified to include this new EF_c term.

DOH: The 180 day exposure duration was incorrect. 250 is the appropriate exposure frequency.

Page A8 (F(x) - Function dependent on U_m/U_t, derived using Cowherd et al. (1985)).

Suggestion: Since U_m and U_t are site specific values, it follows that F(x) can also be determined on a site-specific basis. The Advisory Group suggests revising Table A2 to allow the modification of this parameter in Tier 2.

DNR: Agreed. Changes made.

Page A8 (IRS_c - Soil Ingestion Rate for an Adult).

Suggestion: The Advisory Group believes the Department meant IRS_A to define the soil ingestion rate for an adult, not IRS_c as indicated in Table A2. The Advisory Group suggests Table A2 be changed accordingly.

The default soil ingestion rate for an adult is listed as 100 mg/day

for Scenarios A, B and C. This value, however, only corresponds to the standard soil ingestion rate for an adult in a residential land-use setting and therefore is only appropriate for sites classified as Scenario A. USEPA recommends that the standard soil ingestion rate for an adult be 50 mg/day (USEPA, 1991) for commercial and industrial land-use settings (equivalent to CALM Scenario B and C, respectively). Accordingly, the Advisory Group suggests revising Table A2 to reflect a 50 mg/day soil ingestion rate for an adult for Scenarios B and C.

DOH: We agree that IRS_A was intended. As stated earlier (page 4), USEPA uses the 50 mg/day value for office (indoor) workers. For Tier 1, 100 mg/day is appropriate as a conservative assumption. Modifications could be made in a Tier 2 analysis if the exposure scenario could be assured; for example, if the site was to be covered with an office building with little or no open space or grounds keeping activities.

Page A8 (IRS_A - Soil Ingestion Rate for a Child).

Suggestion: The Advisory Group believes the Department meant IRS_C to define the soil ingestion rate for a chid, not IRS_A as indicated in Table A2. The Advisory Group suggests Table A2 be changed accordingly.

The default soil ingestion rate for an child is listed as 200 mg/day for Scenario B. This is not consistent with a commercial land-use setting and is contrary to the narrative explanation found in Appendix B, page B8, of the CALM guidance document, which indicates that a child ingestion rate of 100 mg/day (0.1 grams per day) was used. The value of 100 mg/day is more consistent with the commercial land-use setting. Consequently, the Advisory Group suggests revising Table A2 to reflect a 100 mg/day soil ingestion rate for a child for Scenario B.

DNR: The IRS_A error has been corrected.

Page A8 (K_{oc} - Soil Organic Carbon-Water Partition Coefficient).

Suggestion: The K_{oc} value for any of the ionizing organics is a function of soil pH and is therefore dependant on site-specific conditions. The Advisory Group suggests revising Table A2 to allow the modification of K_{oc} in Tier 2.

DNR: Table A2 has been changed to allow modification of K_{oc} for ionizable organics at Tier 2.

Page A8 (Q/C - Inverse of Mean Contaminant Concentration at Center of Square Source [$(g/m^2\text{-sec}) / (kg/m^3)$])

Suggestion: The value of Q/C is dependent on both the size and meteorological

conditions of the site. According to Exhibit 11 of the **USEPA Soil Screening Guidance** (USEPA, 1996), the default value of 81.64 listed in Appendix A, Table A2, corresponds to a 0.5 acre site in Lincoln Nebraska. While this may be an appropriate default value for calculation of Tier 1 STARCs, the Advisory Group believes it is an unreasonable assumption for any site greater than 0.5 acres in size with different meteorological conditions. The Advisory Group, therefore, suggests revising Table A2 to allow the modification of this parameter in Tier 2.

DOH: For a default Q/C dispersion value, we are using Lincoln as the nearest appropriate site for which data exists, as recommended by EPA Region VII. While eastern portions of Missouri are in climate zone VII, the Lincoln value is still fairly representative and we intend to stay with that location. We are using 0.5 acres as a Tier 1 value, since most VCP sites are smaller than this. However, the values for larger sized sites are being included in CALM for use in Tier 2 analysis for larger sites.

Page A8 (SA_A - Skin Surface Area for an Adult).

Suggestion: The Advisory Group believes the Department meant the units to be cm^2, not cm^2, as indicated, and suggests Table A2 be revised accordingly.

The USEPA (1996) standard default value for adult skin surface area is 5000 cm^2 and is based on 25 percent of the total adult skin surface area. The Advisory Group suggests revising Table A2 to reflect a 5000 cm^2 skin surface area for an adult.

DOH: The units should be in cm^2. We do not agree with using the general default for adults, when a more specific value can be estimated. We calculated the surface area value based on both genders, age constraints, and the body parts exposed within the confines of the given scenarios. This is especially important, for example, in scenarios where there is the possibility that people other than a 70 kg male may be working in a short-sleeved uniform.

Page A8 (SA_C - Skin Surface Area for a Child).

Suggestion: The USEPA (1996) standard default value for child skin surface area is 2000 cm^2 and is based on 25 percent of the total child skin surface area. The advisory Group suggests revising Table A2 to reflect a 2000 cm^2 skin surface area for a child.

DOH: See above response.

Page A8 (T - Exposure Interval).

Suggestion: The value listed for Scenario C is $9.5x10^8$ and is based on an expo-

sure duration of 30 years. This is not consistent with the exposure duration (ED_A) listed in Table A2 of 25 yrs for Scenario C. The Advisory Group suggests revising Table A2 by changing the value of T for Scenario C to $7.9x10^8$.

DOH: Agreed.

Page A8 (THI - Target Hazard Index).

Suggestion: Appendix G (Engineering Controls) states that STARC values associated with a THI up to 100 may be acceptable if an approved surface cap is in place. In order to be consistent, the Advisory Group suggests revising Table A2 to allow the modification of this parameter in Tier 2 if an engineering control will be used at the site.

DNR: The department in consultation with the Department of Health has re-evaluated the allowance of THI values greater than 1, even with the use of engineering controls. In some cases, engineering controls may reduce exposure and allow greater concentrations of contaminants to safely remain in place. This may change the level of risk posed by these sites, but it does not change the target risk goal for protection of human health, which has been determined by the Department of Health for non-carcinogens to be THI=1. The same argument applies for the target cancer risk (TR) for carcinogens of 10^{-5}.

The department=s intent in raising the THI (and TR) for capped sites was to recognize the effectiveness of engineering controls in reducing exposure, while still maintaining a limit on the level of contamination allowed to remain in place. The department does not believe that an unlimited amount of contamination should be allowed to remain under a surface cap, even with adequate engineering and institutional controls. Some reasonable limit is required to account for the uncertainty of long term (for example, >50 years) future land use. One way of looking at caps it that they create numerous small hazardous waste landfills across the state. Although institutional controls should provide a large measure of protection for the long term, it is difficult for either the department or the current property owner to foresee future events which could change contaminant mobility, public access, long term cap effectiveness, or maintenance.

The manipulation of THI for non-carcinogens and TR for carcinogens was not a good way to calculate those contaminant limits, because it may create the false impression that the acceptable risk level had changed. Instead, the department has chosen to set the limit by simply using a multiple of the Tier 1 standard for the appropriate land use scenario. At this time, we intend to use a factor of 10 as a multiplier. So, for example, lead at an industrial site (Scenario C) would be limited to a maximum of 660*10 =

6600 mg/kg under a cap. The department may need to modify the multiplier value in certain cases, such as highly leachable or highly non-leachable contaminants. For example, the limits might be higher for highly insoluble lead mine tailings and lower for highly leachable lead battery waste.

Page A8 (TR - Target Cancer Risk)

Suggestion: Appendix G (Engineering Controls) states that STARC values associated with a TR up to $1x10^{-3}$ may be acceptable if an approved surface cap is in place. In order to be consistent, the Advisory Group suggests revising Table A2 to allow the modification of this parameter in Tier 2 if an engineering control will be used at the site.

DNR: See the response to the previous comment. Acceptable levels under a cap will be calculated by other means rather than modifying cancer risk or hazard index.

APPENDIX A, FIGURE A3

Pages A11 and A12.

Suggestion: Figure A3 states that the first order degradation constant (ë) may be measured in the field. Although it may be possible to conduct a field experiment to determine ë on a site-specific basis, the cost for such a study would likely be prohibitive. The values for ë are primarily based on constituent physical/chemical properties and are not likely to vary much based on site specific conditions. The Advisory Group suggests removing ë from the list of parameters which may be modified at Tier 2 based on field measurements and further suggests that values for ë be determined based on data in the available literature.

The Advisory Group also suggests that C_{DER}, AF, á, á á F(x), K_{oc}, Q/C, THI, and TR, be added to the list of parameters that may be modified in Tier 2 based on site-specific data.

DNR: See the department=s responses to the previous suggestions regarding ë (page 11), K_{oc}, (page 25), and á (page 23), AF (page 22), F(x) (page 24), Q/C (page 25). C_{DER} is allowed to be modified at Tier 2. THI and TR are being kept constant at all sites and all tiers per DOH.

APPENDIX A, TABLE A3

Pages A13-A19.

Suggestion: Table A3 contains values for the dermal toxicity criteria RfDd and

SFd. The primary toxicological references (IRIS and HEAST) do not provide dermal toxicity criteria. It is recognized that dermal toxicity criteria can be derived from oral RfD (RfDo) and oral SF (SFo) values. However, to calculate dermal toxicity criteria from oral toxicity criteria it is necessary to make an assumption regarding the gastrointestinal absorption or oral absorption efficiency for each constituent. This information is not discussed in the CALM guidance document. It is understood that gastrointestinal absorption (oral absorption efficiency) is chemical specific, and would not be subject to modification in a Tier 2 evaluation. Since this information was not presented in the CALM guidance document, it is not possible to provide comments on the values used for gastrointestinal absorption. The Advisory Group requests that these values be presented to the workgroup for review prior to the release of the final CALM guidance document.

Table A2 indicates a default value of 1 for dermal absorption, while Appendix B, Section 3.3 provides alternative default absorption factors when compound specific factors are not available. It is unclear which factor was used to calculate the Tier 1 STARCs. The Advisory Group suggests adding a new column to Table A3 that includes the dermal absorption factors used to generate the Tier 1 STARCs.

DOH: The oral absorption efficiency (OAE) was discussed in the text. A default value of 100%, in accordance with EPA guidance, was used where chemical-specific data was not available. The listing of 1 for dermal absorption in the table was in error. The OAE should be listed as chemical-specific in Table A2. The oral and dermal variables were inadvertently left out of the equations.

APPENDIX A, TABLE A4

Pages A20-A26.

Suggestion: Some constituents in Table A4 have either no data or incomplete data, yet have Tier 1 Leaching to Groundwater Pathway (C_{LEACH}) values presented in Appendix B Table B1. For example, antimony has no data presented for Kd in Table A4, yet a value of 5.3 mg/kg is presented for antimony in Table B1. The Advisory Group requests that all chemical property data used to generate the Tier 1 STARC values be included in Table A4.

DNR: Some of the tables were not complete in the draft, particularly Kd. The tables were reviewed in detail and supporting data has been included for all Tier 1 calculations. We suspect that chemical property data exists for some compounds but does not appear in the table. The database will be revised and updated as more information is located.

INSTITUTIONAL CONTROLS

The mandatory institutional control provisions in the proposed CALM guidance document mark a significant departure from previous drafts of CALM. The previous draft CALM guidance document (March 13, 1997), outlined the various institutional controls available and their inherent limitations. That draft gave the MDNR the authority not only to determine on a site-by-site basis whether institutional controls were necessary or appropriate, but also the authority to tailor the controls to fit the particular site, taking into account any special circumstances that may exist. The new draft CALM guidance document removes all discretion, requiring a deed restriction in the form of a restrictive covenant, an easement, annual inspections, and a contract with MDNR that would provide for penalties and the collection of a monitoring fee for every site cleaned up to a commercial (scenario B) or industrial (scenario C) standard and any site where an engineered barrier has been utilized. Only those sites able to meet CALM=s conservative residential (scenario A) standards are exempt from these provisions. The Advisory Group believes that the CALM institutional control provisions go far beyond what is necessary to verify and ensure the integrity of a site. Taken together the Advisory Group believes that the institutional control provisions impose such a cloud of uncertainty on future property use that it outweighs the benefits of the No Further Action Letter (NFA).[1] These provisions will deter private parties from participating in the VCP, stifle the revitalization of Brownfields, and deter prospective buyers from taking title to any property subject these restrictions.

DNR: Institutional controls, specifically restrictive covenants, are a necessary part of the risk management process and are widely used by state VCPs across the country. Our contacts with other state VCPs indicate that the effectiveness and durability and institutional controls is a primary matter of concern among the states. Sites remediated to a standard suitable for commercial or industrial use require strong and durable controls to ensure that the property use does not change. Because property use is a determining factor in generating appropriate cleanup standards, property use must not change significantly. If the land use scenario changes dramatically, the methods and variables used to generate the cleanup standards for the site are no longer valid. The department feels that the restrictive covenant and the easement and inspection provisions are the best tools available to ensure that property use is controlled so that the remedial actions taken and the cleanup standards achieved remain protective. One of the major stated needs of industry, business and developers nationally has been Aknown end points" for cleanup standards and acceptable reuse. Rather than imposing a Acloud of uncertainty" with respect to future property use, a well-constructed restrictive covenant should clear the air by stating what current and future property uses are allowable and approved by state and federal regulators, given the cleanup standards achieved at the site. Redevelopers should benefit from knowing exactly what uses are appropriate for a specific property. It is also important to keep in mind that restrictive covenants which allow, prohibit or require certain activities are quite common and often create very little impediment to property resale.

PUBLIC PARTICIPATION

The Advisory Group believes the CALM guidance document places excessive public participation burdens on sites undergoing voluntary remediation under the VCP. Information about all VCP sites, including the reports and correspondence from the property owner as well as MDNR=s comments, is available in MDNR=s public files or by contacting the MDNR project manager. Interested members of the public can readily learn about a site=s participation and involvement with the VCP from these sources.

The need for information disbursement and receipt of input from the community will vary considerably from site to site. The greater the degree of flexibility, the more likely it is that an appropriate effort to provide for public participation can be negotiated with the property owner. Lack of flexibility in this area is a strong disincentive to participation in the VCP.

DNR: Public participation requirements were included in CALM for several reasons: 1) The department believes they are an essential element of a remedial action that allows any contamination to remain, and where a particular land use is being permanently assigned to the property. Such actions have impacts on people living near the site and they have a right to be made aware of and have input on those remedial actions. 2) Environmental justice issues addressed by Title 6 illustrate the need to get the community involved in projects dealing with environmental contamination that may affect community members; 3) the Brownfields process brings the community into the process of community revitalization, because brownfield redevelopment is intended to revitalize communities, not just discrete parcels of property; 4) finally, the VCP=s Memorandum ofAgreement with EPA Region VII requires that the VCP include public participation requirements that ensure communities near VCP sites have some input into the process.

The department believes it must retain the public participation requirements in CALM. However, after further consideration, we agree with the comment that the degree or amount of public participation necessary for a given site should be, discretionary on the part of the VCP and the participant and should not be strictly tied to the tier under which the site is evaluated. Therefore, we have modified Appendix E so that all requirements beyond the requirement to notify a representative of the city, town, or county in which the project is located will be decided on a site-by-site basis with consideration of input from the VCP participant. While these changes build discretion into the public participation process, it is anticipated that at least some of the requirements beyond the minimum will be required for each project using the VCP.

Appendix E, Section 2.2.

Suggestion: Section 2.2 B.(2), Section 2.3A.(5), and Section 2.4A.(3), all con-

tain similar language indicating that all comments received as part of the public participation process must be considered by the VCP participant, in consultation with the MDNR, in choosing an appropriate remedial action plan. The Advisory Group is unclear what the Department means by Aconsidered." The Advisory Group would oppose any interpretation that would give the general public a voice in determining the form of the cleanup taken provided, of course, the cleanup is consistent with the requirements of CALM (which we agree is designed to be protective of human health and the environment).

Section 2.2 B.(3), Section 2.3 A.(8), and Section 2.4 A.(7), all contain provisions that establish a mechanism for resolving disputes that arise from the public participation process. The Advisory Group is uncertain what constitutes a Adispute," and suggests including explanatory language in the CALM guidance document.

Section 2.2 C., Section 2.3 A.(7), and Section 2.4 A.(6), should be eliminated. The mechanism outlined by the Department for public participation make this additional level of potential action unnecessary.

DNR: By Aconsidered," the department envisioned taking into account each comment that has merit. This includes comments made by affected parties that concern the cleanup standards, proposed remedial actions, or the overall risk associated with the project. Any such comments will be evaluated by the department in light of cleanups done at other VCP sites. As pointed out above, the department believes it is appropriate, useful, and important to involve the public in decisions that have an effect on and in their community. We expect that these provisions are not expected to significantly interfere with most cleanups, based on past experience. They simply allow for reasonable community involvement where appropriate. This is particularly important for large brownfield redevelopments and in cases where the property is publicly owned.

Use of the word Adispute" in sections 2.2.B(3), 2.3.A(8), and 2.4.A(7) (now section 2.2.C(5)) of CALM, meant a situation in which an affected party and the volunteer, could not come to an agreement on the appropriateness of one or more aspects of the cleanup. These aspects we include the cleanup levels calculated for the site, the remedial actions chosen for the site, or the overall risk associated with the project.

We do not agree that sections 2.2.C, 2.3.A(7), and 2.4.A(6) (now section 2.2.D) can be deleted. The words Amay require" indicate that additional public participation actions will be required only in situations where the most basic public participation requirements are insufficient to address the concerns of affected parties. This provision was included to allow flexibility in unusual or unexpected situations.

RESTRICTIVE COVENANT

Section 4.1 of the CALM guidance document states that restrictive covenants will be placed in the chain of title Aany time contaminants are left on a site at concentrations that exceed cleanup levels determined using the Scenario A land use exposure assumptions." The Advisory Group believes that this requirement goes well beyond placing future property owners on notice of the extent of contamination on all or part of a piece of property and the actions taken to address such contamination.

Paragraph 10 of the restrictive covenant provides that Athe Owner shall prohibit all activities on the Property which may interfere with the response activities, operation and maintenance, long-term monitoring, or measures necessary to assure the effectiveness and integrity of a remedial action." Such overly broad use-restrictions seriously impair the value and marketability of real property. In addition, it places the site owner in the very difficult position of persuading would-be lenders and prospective purchasers that profitable and necessary use of the property would not be prohibited by this broad proscription. It should be noted that such broad language and the provision in paragraph 14 that provides that the ARestrictive Covenant shall continue into perpetuity" are not favored by appellate courts.[2] Although Appendix E of the CALM guidance document does provide a mechanism for rescinding the restrictive covenant, no such mechanism can be found in the model deed restriction. The absence of any such provision only serves to further impair marketability.

DNR: The department believes the restrictive covenant is a necessary risk management tool that ensures property use remains appropriate given the risk-based and property use-based standards achieved by the remediation. The assurance of property use is an essential element of the cleanup and therefore a necessary part of the restrictive covenant. The actions addressed in paragraph 10 are prohibited in order to manage the risk associated with a site remediated to standards other than the Scenario A (unrestricted use) standards. The department believes it is absolutely necessary to prevent such activities so that the exposure variables applicable at the time of remediation do not significantly change. Likewise, site development not consistent with the site conditions and contaminant levels remaining on site should be prohibited so that unnecessary exposures to hazardous substances do not occur. Paragraph 10 is simply a statement that the cleanup and post-closure plans cannot be interfered with. If the intended land use interferes with the plan, then a different remedial action plan or a different land use should be considered.

If these provisions affect the marketability of a property, one must remember that the degree of remediation conducted at most sites is at the discretion of the VCP participant; if more flexibility in the allowable use of the property is desired, the property may be remediated to meet a more conservative cleanup standard, thus freeing the property for additional uses. The department is not mandating the extent of remediation or the imposition of restrictions. In fact, CALM has broadened the range of cleanup

standards in order to accommodate cleanups to less than unrestricted-use standards. The volunteer is given the freedom to select the cleanup goal.

Based on comments from the Task Force, the restrictive covenant has been re-formatted. We have adopted a more Amodular" approach using a menu of form paragraphs which can be used to tailor each restrictive covenant to the site=s requirements.

Regarding the absence of a provision for rescinding the restrictive covenant, this was an oversight by the department. Although we intended that the covenants could - and should - be removed when site conditions warrant, no clear mechanism was given. The covenant can be rescinded using the new form in Appendix E, Attachment E3.

To accommodate changes in site conditions that may decrease the necessary restrictions (short of total removal of the covenant), an Amendment/ Modification document has been developed which can be filed in the chain of title to modify the covenant with DNR approval. This has been included as Attachment E4.

EASEMENT / INSPECTIONS

An easement is a grant of an interest in land that entitles a person to use land possessed by another. Paragraph 6 of the model restrictive covenant purports to grant MDNR a non-exclusive easement over the property to Ainspect the Property and perform such investigations and actions as the MDNR deems necessary for any one or more of the following purposes:

Ensuring that the use, occupancy, and activities of and at the Property are consistent with this Restrictive Covenant;

ii. Ensuring that any remediation implemented complies with state law, including but not limited to '260.350, et seq., RSMO; '260.565, et seq., RSMO; '260.435, et seq., RSMO; '260.500, et seq., RSMO;

iii. Performing any additional investigation or remediation necessary to protect human health and the environment;

[iv. Ensuring the structural integrity of any engineering controls described in this Restrictive Covenant and Grant of Easement and their continuing effectiveness in containing pollutants and limiting human exposure to pollutants.]"

The above easement gives the Department cart blanche to enter the site, inspect, investigate, remediate, and practically anything else, regardless of whether the activities relate to the original site characterization and voluntary cleanup. This is an extremely broad

grant of authority when viewed in light of the stated purpose for requiring the easement, which is to allow the MDNR access to the site to conduct inspections to ensure the use of the property has not substantially changed and to evaluate the condition of engineering controls installed on the property.

Many of the sites that will enter the VCP, by their very nature, are not heavily regulated by the Department; they are not subject to RCRA and are not subject to listing in the Missouri Registry. Such sites would rarely, if ever, be inspected by the Department. Under the CALM guidance document, however, these sites would be subject to, at a minimum, annual inspections in perpetuity. While the Department states in the CALM guidance document that the annual inspections would be for the purpose of ensuring that the

property=s use is consistent with the restrictive covenant, many restrictive covenants will impose site-wide restrictions, thereby giving the Department the opportunity (if not the obligation) to conduct a site-wide inspection. While the Advisory Group believes that Department personnel would limit such an inspection to only those purposes outlined in the CALM guidance document, it is important that the scope of the inspection be made abundantly clear. This would diminish the fears of the some the Advisory Group that foresee the escalation of these inspections into annual compliance inspections for air, water, and waste.

DNR: Our intention in requiring inspections for all properties for which a restrictive covenant has been recorded is to ensure that the provisions of the restrictive covenant are being met, and nothing more. The department has no intention of conducting general environmental compliance inspections for air, water, and waste using the VCP inspection as permission. This is not to say that flagrantly unlawful or inherently unsafe conditions or activities at the site that are not associated with the restrictive covenant conditions can be ignored if observed during a restrictive covenant inspection. One of the responsibilities of the department is to address such conditions and activities. However, the department has other mechanisms for addressing these issues and has no intention of using the CALM Restrictive Covenant for purposes unrelated to the cleanup or post-closure care. To further clarify this, Section 6, Part iii of the covenant now specifies that any additional investigation or remediation conducted by the department under the easement will be limited to that related to the VCP cleanup.

PENALTIES

The CALM guidance document requires all site owners whose property will be subject to a restrictive covenant, to enter into a contract with MDNR that will provide, among other things, for the collection of penalties should the requirements of the restrictive covenant breached. The penalties, as outlined in the contract, could range from a minimum of $5,000 per day per occurrence to a maximum of $10,000 per day per occurrence. This contract appears to give the Department authority it does not have under the VCP. In addition, the placement of an executory contract in the chain of title will raise a cloud over the property=s title limiting marketability and operating as yet another serious

disincentive to participate in the VCP. The Advisory Group believes that the contract is not necessary. In the event the terms of the restrictive covenant are violated, the Department can void the No Further Action Letter and presumably bring an enforcement action against the site owner requiring additional site remediation activities be undertaken. This is a sufficient Ahammer." Penalties are not needed.

DNR: The department believes that rescinding the No Further Action Letter may be an inadequate measure, so some kind of penalty provisions are necessary. Many other state VCPs are including penalty provisions as part of their institutional controls. For example, Illinois has a penalty ceiling of $25,000 per day, Texas $10,000.

However, it is apparent that the subject has caused concern by the task force. The wording of the contract may have given the impression that penalties would be imposed automatically with any violation and that there was little or no flexibility. Several key revisions have been made in response to this concern. The lower end of the penalty range has been lowered to $100 per day. Also, the phrasing of the penalty provision of the contract (section 4) has been changed from Ashall pay a penalty" to Amay be required to pay a penalty". The department would first make attempts

to bring the site into compliance before assessing penalties, by notifying of the noncompliance and allowing a reasonable time for it to be corrected. Although this was our intent from the beginning, it was not clearly stated either in the text or the contract itself. Language has been added to the text in Appendix E to further clarify.

SUMMARY OF INSTITUTIONAL CONTROL COMMENTS

The extent to which the Department=s proposal has gone beyond the mandate and the intent of the VCP can be illustrated by comparing the burdens outlined in the CALM guidance document (for those sites that cannot achieve the conservative residential standards) with those burdens imposed on sites listed on the Missouri Registry for Uncontrolled and Abandoned Hazardous Waste Sites. The Advisory Group believes the following chart shows the excessive nature of the institutional control provisions in the CALM guidance document, especially in light of the fact that the sites that will be subjected to these requirements will have been **voluntarily** remediated.

Burdens Imposed On Missouri Registry Sites	**Burdens Imposed On VCP Sites**
Voluntarily agree to enter program and pay Department=s oversight costs	Department lists site, property owner has right to appeal
Deed Restrictions	Deed Notice
Easement granted to MDNR	No equivalent
One-time Inspection/Monitoring Fee	No fee
Annual Inspection at a minimum.	Typically an annual inspection
Prior notice of intent to transfer property notice to Department within 30 days of transfer	Notice to buyer of site listing and

Minimum penalties of $5,000 to maximum of $10,000 per occurrence $1,000 penalty

Change of use requires Department Approval. No appeal procedure identified and no appeal may be allowed since the burdens imposed are through contract and not administrative action. ASubstantial Change" in use requires Department approval. Appeals of MDNR decisions go to Hazardous Waste Commission

SUGGESTIONS

In light of the comments presented above regarding the proposed institutional controls, the Advisory Group suggests revising the CALM guidance document to reflect the following changes.

The No Further Action Letter should serve as the primary institutional control. The exact terms of the NFA letter should be crafted on a site-by-site basis. The NFA letter would, among other things, memorialize the long-term obligation to maintain the property classification or engineered barrier. The NFA letter would be made part of the property=s chain of title so that any potential buyer of the property, or even potential purchaser of an easement across the property, would have record notice that the contamination exists and that the property is subject to certain control mechanisms.

Although the Advisory Group feels strongly that the NFA Letter should be the primary institutional control, other institutional controls, such as restrictive covenants, negative easements, and local ordinances, have value under specific circumstances. Use of any of these additional control mechanisms should be the subject of additional negotiation between the applicant and the Department.

It should be made clear under what circumstances the Department will require an institutional control be recorded in the chain of title. Those circumstances should be limited to whenever the user takes advantage of any combination of the following measures: 1) restrict a site to industrial/commercial use; 2) establish remediation objectives based on a target cancer risk greater than $1x10^{-5}$; 3) establish remediation objectives based on a target hazard quotient greater than 1 for noncarcinogens; 4) rely on an engineered barrier; or 5) set the point of human exposure at a location other than the source.

The mandatory annual inspection and easement provisions should also be removed and replaced with annual compliance reporting by the site owner along with random inspections of a small percentage of those sites that have completed the CALM process.

The penalty provisions in the CALM guidance document should also be removed. The Department=s authority to void the NFA letter and the ability to bring an enforcement action against the site owner to require further remediation is sufficient. Additionally, the VCP statute makes it a Class A misdemeanor to submit false information in connection with a VCP site. This should be a sufficient deterrent to ensure that annual compliance assur-